

What is claimed is:

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1           1.    A low cost, high reliability interposer for use in  
2    electronic packages, comprising:

3           a)    at least one dielectric layer having one major  
4                surface and at least one edge;

5           b)    a plurality of conductive pads, each having a  
6                first and second surface, spaced apart on said  
7                major surface of said at least one dielectric  
8                layer, said first surface of said conductive pads  
9                being plated with at least one layer of metal, and  
10              at least a portion of said second surface of said  
11              conductive pads being readily adaptable for  
12              connection to a conductive member;

13          c)    a plurality of openings with a non-uniform cross  
14                section, each one corresponding to and aligned  
15                with one of said conductive pads; and

16          d)    a plurality of conductive members, each one  
17                located within one of said openings and in  
18                electrical contact with said portion of said  
19                second surface of said conductive pads.

1           2.    The interposer as recited in claim 1, wherein said  
2    at least one dielectric layer comprises an insulative  
3    material.

1           3.    The interposer as recited in claim 2, wherein said  
2    insulative material is polyimide.

1           4.    The interposer as recited in claim 2, wherein said  
2    insulative material is a liquid crystal polymer.

1           5.    The interposer as recited in claim 2, wherein said  
2    insulative material is epoxy-glass-based.

1           6.    The interposer as recited in claim 2, wherein said  
2    insulative material has a coefficient of thermal expansion  
3    (CTE) that substantially matches the CTE of the material to  
4    which it is to be attached.

1           7.    The interposer as recited in claim 1, wherein said  
2    conductive pads comprise copper.

1           8.    The interposer as recited in claim 1, wherein said  
2    first surface of said conductive pads being plated with at  
3    least one layer of metal is plated with nickel.

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1           9.    The interposer as recited in claim 8, wherein said  
2   first surface of said conductive pads being plated with at  
3   least one layer of metal is also plated with gold.

1           10.   The interposer as recited in claim 1, wherein said  
2   plurality of openings comprises a stepped cross section

1           11.   The interposer as recited in claim 1, wherein said  
2   plurality of openings comprises a tapered cross section.

1           12.   The interposer as recited in claim 1, wherein said  
2   conductive members comprise solder.

1           13.   The interposer as recited in claim 1, wherein said  
2   conductive members are comprised of conductive paste.

1           14.   The interposer as recited in claim 13, wherein  
2   said conductive paste comprises solder paste.

1           15.   The interposer as recited in claim 1, further  
2   comprises alignment means to align said carrier to a  
3   structure adapted to mate therewith.

1           16. The interposer as recited in claim 1, wherein said  
2 interposer may be attached to a structure adapted to mate  
3 therewith by a reflow process.

1           17. The interposer as recited in claim 16, wherein  
2 said reflow process of said interposer to said structure is  
3 performed under uniform pressure.

1           18. A method of forming a low cost, high reliability  
2 interposer for use in electronic packages, said method  
3 comprising:

4           a) forming a first substructure comprising at least  
5 one first dielectric layer, at least one metal  
6 layer, and at least one first opening abutting  
7 said at least one metal layer;

8           b) forming a second substructure comprising at least  
9 one second dielectric layer and at least one  
10 second opening;

11          c) providing an adhesive layer intermediate said  
12 first and second substructures; and

13          d) aligning and laminating said first and second  
14 substructures and said adhesive layer, at least  
15 one of said first openings being aligned with at  
16 least one of said second openings, thereby  
17 exposing a portion of said at least one metal  
18 layer.

1           19. The method according to claim 18, wherein said  
2       step (a) forming a first substructure comprises the substeps  
3       of:

4           i)     providing said at least one first dielectric layer  
5                 comprising first and second sides;

6           ii)    forming said at least one first opening in said at  
7                 least one first dielectric layer;

8           iii)   providing an adhesive layer to bond said at least  
9                 one first dielectric layer to said at least one  
10                metal layer;

11          iv)    laminating said adhesive layer and said at least  
12                 one metal layer to one side of said at least one  
13                 first dielectric layer; and

14          v)     masking, exposing and etching said at least one  
15                 metal layer as required to create predetermined  
16                 metallic features.

1           20. The method according to claim 19, wherein said  
2           step (b) forming a second substructure comprises the  
3           substeps of:

4           i)    providing said at least one second dielectric  
5           layer; and

6           ii)   forming said at least one second opening in said  
7           at least one second dielectric layer.

1           21. The method according to claim 18, the steps  
2           further comprising:

3           e)    introducing conductive material into said aligned  
4           openings and in electrical contact with said  
5           exposed portion of said at least one metal layer.

1           22. The method according to claim 21, wherein said  
2           conductive material is solder paste.

1           23. The method according to claim 22, the steps  
2           further comprising reflowing said solder paste.



1           24. The method according to claim 18, wherein the  
2 diameter of said at least one second opening is equal to or  
3 greater the diameter of said at least one first opening.

1           25. The method according to claim 19, wherein said at  
2 least one first dielectric layer comprises an insulative  
3 material.

1           26. The method according to claim 25, wherein said  
2 insulative material is epoxy-glass-based.

1           27. The method according to claim 26, wherein said  
2 insulative material comprises FR4.

1           28. The method according to claim 20, wherein said at  
2 least one second dielectric layer comprises an insulative  
3 material.

1           29. The method according to claim 28, wherein said  
2 insulative material is epoxy-glass-based.

1           30. The method according to claim 29, wherein said  
2 insulative material comprises FR4.

1           31. The method according to claim 18, wherein said  
2 openings are provided in said first and said second  
3 substructures by a process selected from the group  
4 consisting essentially of ablation, etching, routing,  
5 drilling, and punching.

1           32. The method according to claim 19, wherein said at  
2 least one metal layer comprises copper.

1           33. The method according to claim 19, wherein said at  
2 least one of said predetermined metallic features comprises  
3 a contact pad.

1           34. The method according to claim 18, wherein said  
2 laminating occurs at a temperature of approximately 185  
3 degrees F. and a pressure of approximately 20 pounds per  
4 square inch (PSI).